Factors Effecting Mortality on Patients Operated on Due to Gastric Carcinoma

Mide Kanseri Nedeni ile Opere Edilen Hastalardaki Mortaliteyi Etkileyen Faktörler

Mortality on Patients with Gastric Carcinoma

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Özet

Amaç: Çalışmanın amacı, mide kanseri nedeni ile hastanemizde opere edilen hastaların kayıtlarının geriye dönük olarak incelenerek mortaliteyi etkileyen faktörlerin belirlenmesidir. Gereç ve Yntem: Mide kanseri nedeni ile opere edilen 170 hastanın nüfus bilgileri (yaş, cinsiyet, iletişim bilgileri, hastane kayıt numaraları ve vatandaşlık numaraları), hastalara uygulanan cerrahi prosedürler (total/subtotal gastrektomi), hastaların histopatolojik tanıları (tümör boyutu, lenf nodu durumu ve sayısı), patolojik evreleri, serum albumin düzeyleri, tümör belirteçleri, tam kan sayımları ve sağkalım durumları incelenmiş ve kayıt altına alınmıştır. Bu verilerden; metastarik lenf nodu oranı (MLR), kırmızı küre dağılım genişliği-platelet oranı (RPR), nötrofil-lenfosit oranı (NLR), platelet-lenfosit oranı (PLR) ve prognostik beslenme indeksi (PNI) değerleri hesaplanmıştır. Bulgular: Bağımsız parametrelerin tek değişkenli analizi sonucunda; NLR, MLR, yaş, evre ve cinsiyetin genel mortalite üzerinde etkili olduğu saptandı. Bu sonuçların çok değişkenli analizinde (Cox regresyon analizi); yaş, evre ve RPR istatistiksel olarak anlamlı bulunarak bağımsız prognostik değer olarak saptandı. Tartışma: Mide kanseri nedeni ile opere edilen hastalarda; yaşın 68'in üzerinde olması, RPR oranının 0.038'den fazla olması ve evrenin 4 olması kötü prognostik kriterler olarak bulunmuştur.

Anahtar Kelimeler

Mide Kanseri; Mortalite; Prognostik Faktörler

Abstract

Aim: The purpose of the study is to investigate the results of data obtained from the records of patients who were operated due to gastric carcinoma in our hospital, to determine whether the evaluated variables have an effect on mortality. Material and Method: Demographic information (age, gender, contact information, hospital registration, and citizenship number), types of surgery performed (total/subtotal gastrectomy), histopathological diagnosis (tumor size, lymph node calculation and status), pathological stage, serum albumin levels, tumor markers, complete blood count, and survival status of 170 patients who underwent surgery due to gastric carcinoma were observed and recorded. According to these data, metastatic lymph node ratio (MLR), red cell distribution width - platelet ratio (RPR), neutrophil - lymphocyte ratio (NLR), platelet - lymphocyte ratio (PLR), and prognostic nutritional index (PNI) values were calculated. Results: According to the univariate analysis of the independent variables which effect mortality, NLR, MLR, age, stage, and gender parameters were found statistically significant ($p<0.05$). According to the multivariate analysis (Cox regression analysis), age, the stage of disease, and RPR were found statistically significant. Discussion: For patients who underwent surgery due to gastric carcinoma, being over the age of 68, RPR rate higher than 0.038, and disease in stage 4 have been determined as prognostic factors which have negative effects on mortality.

Keywords

Gastric Carcinoma; Mortality; Prognostic Factors

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Introduction

Gastric carcinoma is the fourth most common cancer and is second in cancer-related mortality. Compared to previous years, a significant reduction of gastric carcinoma related mortality rates has been seen, yet, worldwide, it is still one of the most common cancer types with one of the highest mortality rates. [1]. It has been estimated that one million newly diagnosed gastric cancer cases were registered in 2008 [2]. Although well-defined prognostic factors have an effect on the mortality of patients with gastric carcinoma, none of the factors is an excellent predictor of mortality. The purpose of the study is to investigate the results of data obtained from the records of patients who were operated due to gastric carcinoma in our hospital to see whether the evaluated variables have an effect on mortality, and to compare our results to the literature, where possible.

Material and Method

This retrospective cohort study is based on 170 patients with gastric carcinoma who underwent elective gastrectomy (total or subtotal) and D2 lymph node dissection at Ankara Numune Training and Research Hospital from January 2011 to January 2013. Patient data were obtained from hospital records and patient files. Demographic information (age, gender, contact information, hospital registration, and citizenship number), localizations of tumors, types of surgery (total/subtotal gastrectomy), histopathological diagnosis (tumor size, lymph node calculation and status), pathological phases [3], serum albumin levels, tumor markers (CEA: carcinoembryonic antigen; CA 19-9: carbohydrate antigen 19-9; AFP: alpha fetoprotein), complete blood count, and survival status of 170 patients who underwent surgery due to gastric carcinoma were observed and recorded. According to these data, metastatic lymph node ratio (MLR), red cell distribution width - platelet ratio (RPR), neutrophil - lymphocyte ratio (NLR), platelet - lymphocyte (PLR), and prognostic nutritional index (PNI: Albumin+[5 x Lymphocyte countx109]) values were calculated.

Patients with incomplete data and patients who received neoadjuvant chemotherapy were excluded from the research. The Cancer Staging Manual by the American Joint Committee on Cancer was used for the staging of the patients [3].

Statistical analysis

Data were tested for normality and were found to be non-normally distributed. Accordingly, continuous data are presented as mean and standard deviation (SD) with non-parametric analyses being used to assess differences. The Mann-Whitney U test and the x2 test were used to assess differences where appropriate. Logistic regression was used to identify the factors associated with mortality. Results of the multivariate analysis are shown as odds ratios (OR) with 95% confidence intervals (CI). All statistical procedures were performed with SPSS 15.0 (SPSS Inc, Chicago, Illinois). A p-value of <0.05 was considered significant.

Independent Variables

The age, gender, surgery type, pathological stages, tumor markers (CEA, CA19.9, AFP), MLR, RPR, NLR, PLR, and PNI are the independent variables.

Dependent Variables

The primary end-point of the study is determining factors effecting mortality.

Results

Within the total of 170 total patients, 52 (30.6%) were female and 118 (69.4%) were male. The average age was 63.90±11.14 (36-90). Total gastrectomy was performed on 81 (47.6%) patients and subtotal gastrectomy was performed on 89 (52.4%) patients. Tumor localizations and preferred surgical treatments are shown in Table 1. Subtotal gastrectomy was the preferred method for the tumor localized in the distal third of the stomach. Total gastrectomy was the preferred method for the other tumors. According to the pathological staging of the patients, 21 patients were evaluated as stage 1 (12.4%), 43 as stage 2 (24.1%), 85 as stage 3 (51.2%), and 21 as stage 4 (12.4%). Histopathological examination showed: adenocarcinoma in 163 patients, schwannoma in 1 patient, lymphoma in 4 patients, gastrointestinal stromal tumor in 1 patient, and a neuroendocrine tumor in 1 patient. Regarding the differentiation rate , 95 patients were reported as poorly-differentiated, 57 as moderately-differentiated, and 18 as well-differentiated. Minimum and maximum follow-up duration of patients were 12 and 36 months, respectively. During follow-ups, 54 of the 170 patients (31.8%) had died because of cancer-related morbidity (Table 2). According to the univariate analysis of the independent variables which effect mortality, NLR, MLR, age, stage, and gender parameters were found to be statistically significant (p<0.05). According to the multivariate analysis (Cox regression analysis),

Table 1. Tumor localizations and preferred procedures.

Tumor Localization	Patients (n)	Procedure(Total/Subtotal Gastrectomy)
Proximal Third	28 (16.5%)	Total Gastrectomy
Middle Third	53 (31.2%)	
Distal Third	89 (52.3%)	Subtotal Gastrectomy
Total	170 (100%)	

Table 2. Clinicopathologic characteristics of patients

Variable	Data(n=170) Mean±SD
Age (years)	63.90 ±11.14
Gender(M/F)	118 / 52
Surgery type(Total/Subtotal)	81 / 89
Stage (1/2/3/4)	21 / 43 / 85 / 21
Differentiation (well/moderate/poor)	95 / 57 / 18
Survivor/Non-survivor	116 / 54
Positive lymph node count	7.2 ±8.0
CEA	5.2 ±11.8
CA19.9	80.3 ±221.8
AFP	4.0 ±7.8
MLR	0.3 ±0.3
RPR	0.07 ±0.14
NLR	4.1 ±4.8
PLR	203.7 ±171.2
PNI	46.9 ±8.1

CEA: carcinoembryonic antigen; CA 19-9: carbohydrate antigen 19-9; AFP: alpha fetoprotein; MLR: metastatic lymph node ratio; RPR: red cell distribution width - platelet ratio; NLR: neutrophil - lymphocyte ratio; PLR: platelet/lymphocyte ratio; PNI: prognostic nutritional index

age, RPR, and the stage of disease were found to be statistically significant (Table 3). In addition, age over 68, an RPR rate higher than 0.038, and the disease in stage 4 have been determined as prognostic criteria which have negative effects on mortality (Table 4).

Table 3. Multivariate logistic regression model for the factors effecting general survival (95% CI)

Variables	OddsRatio	95% CI	P
Age	1.0475	1.0100 to 1.0864	0.0130*
Stage	2.6539	1.0277 to 6.8532	0.0448*
RPR	4.0480	1.2362 to 13.2555	0.0215*

RDW: Red cell distribution width, RPR: red cell distribution width - platelet ratio, CI: Confidence Interval
*P<0.05 significant

Table 4. Univariate and multivariate analysis results

Univariate Analysis of Variables	Multivariate Analysis of Variables
Age	Age
Gender	Stage 4
Stage	RPR
MLR	
NLR	

NLR: neutrophil/lymphocyte ratio, RDW: red cell distribution width, RPR: red cell distribution width - platelet ratio,
MLR: metastatic lymph node ratio

Discussion

Cancer is considered to be the second most frequent cause of mortality after cardiovascular diseases in developed countries and third most frequent in developing countries [4]. Gastric carcinoma is commonly seen in eastern communities [5].

According to the research carried out by Wang et al, age has been found to be a prognostic parameter for the general survival of patients with gastric carcinoma. In their research, gastric carcinoma mortality in the 65-74 age male population was found to be 12 times higher than in the 30-34 age group. Mortality rates in the 65-69 and 70-74 female populations were found 4.4 and 4.9 times higher, respectively, than in the 30-34 age group. These rates were considered statistically significant [6]. It was also found that there is an increase in mortality with older ages in Japan [7]. Similarly, in our research, age is a prognostic factor for mortality. Although gender was found to be statistically significant in univariate analysis, it was not found as a prognostic factor in multivariate analysis. Being older than the age of 68 directly affects the prognosis. Regarding the effect of age with mortality, in young patients, being physically fit might play a role.

Kelly JR et al. have identified the stage of tumor and the differentiation stage as well-defined prognostic factors [8]. In mid and late stage gastric carcinoma, along with a dramatic decrease in survival, distant metastasis and the possibility of relapse in the postoperative period increases [9]. Despite the development of treatment strategies, these results cannot be reduced Also in our research, being in a later stage in the disease was found as a prognostic factor for mortality. Especially, being in the fourth stage in the disease has a negative effect on survival. On patients in this stage, the effect of distant metastasis on especially vital organs on increasing mortality is not surprising. In our research, the prognostic value of the differentiation stage for mortality was not found statistically significant.

Complete blood count parameters and rates have been evaluated in inflammatory and even malignant diseases in recent years. While Kose et al. found PLR significant in cervical pathology [10], Abakay et al. have found NLR and RDW significant in malignant mesothelioma [11]. According to the research carried out by Zhi-de Hu et al., NLR was found as a prognostic factor for patients with gastric carcinoma [12].On the other hand, it is shown that NLR and PLR have no effect on hospital mortality on patients with gastric carcinoma [13]. There is no research in the literature on the relationship between RPR and mortality of gastric carcinoma. In our research, even though NLR was found to be significant in univariate analysis, it was not found to be significant in multivariate analysis. RPR was found to be an independent factor that effects mortality; having a rate higher than 0.038 has a direct effect on mortality.

In the research carried out by Lorenzon et al., MLR was found to be statistically significant in recurrence and mortality. In our research, even though MLR was found to be significant in univariate analysis, it was not found to be significant in multivariate analysis [14].

In conclusion, for patients who underwent surgery due to gastric carcinoma, being over the age of 68, RPR rate being higher than 0.038, and the disease being in stage 4 have been determined as prognostic criteria that have negative effects on mortality. There is a need for broad, patient participatory, multicentered, prospective research.

Competing interests

The authors declare that they have no competing interests.

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